



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/587,029

07/24/2006

Masahiro Orita

Q96124

9255

65565 7590 10/30/2008
SUGHRUE-265550
2100 PENNSYLVANIA AVE. NW
WASHINGTON, DC 20037-3213

EXAMINER

GREEN, TRACIE Y

ART UNIT

PAPER NUMBER

2879

MAIL DATE

DELIVERY MODE

10/30/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/587,029	Applicant(s) ORITA ET AL.	
	Examiner TRACIE Y. GREEN	Art Unit 2879	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 March 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 October 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>07/24/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 4, and 8-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Andriessen (US 2002/0151094 A1).

Regarding claim 1, Andriessen teaches quantum (Figures 1A -1E) (dot-dispersed light emitting device comprising: a substrate (21); an electron injection electrode (24); a hole injection electrode (21); and an inorganic light emitting layer (22,23) disposed so as to be in contact with both the electrodes (21, 24) ,wherein the inorganic light emitting layer (23) includes an ambipolar inorganic semiconductor material and nanocrystals dispersed as luminescent centers in the ambipolar inorganic semiconductor material (Paragraph 66), and is configured without having, at the interface with the electron injection electrode and/or the hole injection electrode, epitaxial relation therewith (Paragraph 47 and 48).

Art Unit: 2879

Regarding claim 4, Andriessen teaches wherein the inorganic light emitting layer comprises a ZnS type semiconductor phase (Paragraph 47 and 57)

Regarding claim 8, Andriessen teaches wherein the substrate (21) is a glass substrate (Paragraph 90, lines 10-12).

Regarding claim 9, Andriessen teaches wherein the electron injection electrode (24) and the hole injection electrode (21) are disposed spaced apart from each other, with the inorganic light emitting layer (23) interposed there between, in a lamination on the substrate.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 2-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Andriessen (US 2002/0151094 A1) in view of Danek et al. ("Electrospray Organometallic vapor deposition- A novel technique for preparation of Quantum Dot composites").

Regarding claims 2-3, Andriessen teaches the light emitting device set forth above (see rejection claim 1). Andriessen is silent regarding wherein the ambipolar inorganic semiconductor material is an amorphous semiconductor phase or a polycrystal semiconductor phase.

In the same field of endeavor of semiconductor light-emitting devices, Danek et al. teaches wherein the ambipolar inorganic semiconductor material is an amorphous semiconductor phase or a polycrystal semiconductor phase (Abstract, lines 4-7) in order to provide a device with improved emission and light efficiency.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the light-emitting device of Andriessen wherein the ambipolar inorganic semiconductor material is an amorphous semiconductor phase or a polycrystal semiconductor phase (Abstract, lines 4-7) in order to provide a device with improved emission and light efficiency as taught by Danek et al.

5. Claims 5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Andriessen (US 2002/0151094 A1) in view of Mensz (US 5,422,902)

Regarding claims 5 and 7, Andriessen teaches the light emitting device set forth above (see rejection claim 1). Andriessen is silent regarding wherein the inorganic light emitting layer (claim 4) or the hole injection electrode (claim 7) comprises $Zn_pM_{1-p}S_xSe_yTe_{1-x-y}$ (where $0 \leq x, y, x+y \leq 1$, $0 < p \leq 1$, M: alkaline-earth metal, Cd).

In the same field of endeavor of semiconductor light-emitting devices, Mensz teaches wherein the inorganic light emitting layer (Column 3, lines 1-5) $Zn_pM_{1-p}S_xSe_yTe_{1-x-y}$ (where $0 \leq x, y, x+y \leq 1$, $0 < p \leq 1$, M: alkaline-earth metal, Cd) in order to provide a device with decreased operating voltage and allowing for the use of a thinner cladding layer. Mensz does not explicitly teach the hole injection electrode comprises $Zn_pM_{1-p}S_xSe_yTe_{1-x-y}$ (where $0 \leq x, y, x+y \leq 1$, $0 < p \leq 1$, M: alkaline-earth metal, Cd).

Art Unit: 2879

However, one of ordinary skill in the art at the time of the invention could modify the light emitting device of Andriessen wherein the inorganic light emitting layer or the hole injection electrode comprises $Zn_pM_{1-p}S_xSe_yTe_{1-x-y}$ (where $0 \leq x, y, x+y \leq 1, 0 < p \leq 1$, M: alkaline-earth metal, Cd) as taught by Mensz) wherein the inorganic light emitting layer or the hole injection electrode comprises $Zn_pM_{1-p}S_xSe_yTe_{1-x-y}$ (where $0 \leq x, y, x+y \leq 1, 0 < p \leq 1$, M: alkaline-earth metal, Cd) in order to provide a device with decreased operating voltage and allowing for the use of a thinner cladding layer as taught by Mensz.

6. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Andriessen (US 2002/0151094 A1) in view Bulovic et al. (US 2004/0023010 A1).

Andriessen teaches the light emitting device set forth above (see rejection claim 1). Andriessen is silent regarding wherein the nanocrystals contain any of InP, GaAs, and GaP as a main component.

In the same field of endeavor of light emitting devices, Bulovic et al. teaches wherein the nanocrystals contain any of InP, GaAs, and GaP as a main component. (Paragraph 33, lines 5-8) in order to provide a device with zero-dimensional semiconductor structures show strong quantum confinement effects that can be harnessed in designing bottom-up chemical approaches to create complex heterostructures with electronic and optical properties that are tunable with the size of the nanocrystals (Paragraph 7, lines 1-6).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the light-emitting device of Andriessen wherein the

Art Unit: 2879

nanocrystals contain any of InP, GaAs, and GaP as a main component in order to provide a device with zero-dimensional semiconductor structures show strong quantum confinement effects that can be harnessed in designing bottom-up chemical approaches to create complex heterostructures with electronic and optical properties that are tunable with the size of the nanocrystals as taught by Bulovic.

7. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Andriessen (US 2002/0151094 A1) in view Hayashi et al. (US 2002/0167280 A1).

Andriessen teaches the light emitting device set forth above (see rejection claim 1). Andriessen is silent regarding wherein the electron injection electrode and the hole injection electrode are disposed spaced apart from each other in a plane on the substrate.

In the same field of endeavor of light emitting devices, Hayashi et al. (Figure 15, 16) teaches wherein the electron injection electrode (5a) and the hole injection electrode (5b) are disposed spaced apart from each other in a plane on the substrate in order to provide of a device wherein improving reliability of hole and electron injection, the luminance of a light-emitting device, and a light-emitting display can be improved.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the light-emitting device of Andriessen wherein the electron injection electrode and the hole injection electrode are disposed spaced apart from each other in a plane on the substrate in order to provide of a device wherein improving reliability of hole and electron injection, the luminance of a light-emitting device, and a light-emitting display can be improved as taught by Hayashi et al.

Art Unit: 2879

8. Claims 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Andriessen (US 2002/0151094 A1) in view et al. Shitagaki et al. (US 2004/0265624 A1).

Andriessen teaches the light emitting device set forth above (see rejection claim 1). Andriessen is silent regarding wherein a gate electrode is disposed between the electron injection electrode and the hole injection electrode.

In the same field of endeavor of light emitting devices, Shitagaki et al. teaches wherein a gate electrode is disposed between the electron injection electrode and the hole injection electrode in order to provide controlling voltage for the respective electrode layers.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the light-emitting device of Andriessen wherein a gate electrode is disposed between the electron injection electrode and the hole injection electrode in order to provide controlling voltage for the respective electrode layers.

9. Claim 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Andriessen (US 2002/0151094 A1).

Regarding claims 12 and 13, Andriessen teaches the light emitting device set forth above. Andriessen does not explicitly teach display apparatus or illumination comprising the quantum dot-dispersed light emitting device. However one of ordinary skill in the art could utilize the device of Andriessen in a display device or illumination device in order to provide a lamp with lower driving voltage and more durability

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TRACIE Y. GREEN whose telephone number is (571)270-3104. The examiner can normally be reached on Monday-Thursday, 7:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel can be reached on 571/272-2457. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Peter J Macchiarolo/
Examiner, Art Unit 2879

/Tracie Y Green/
Examiner, Art Unit 2879